

vaginal ultrasonography, permitting a confirmation of viability. This technique also permits direct visualization of ectopic pregnancies in many cases, allowing patients to go directly to laparotomy without the need for other diagnostic procedures.

The procedure is equally capable of detecting and characterizing disease involving the uterus, adnexa, and surrounding structures. Small ovarian masses and uterine leiomyomas can be shown. Fallopian tube dilatation, which usually has a nonspecific appearance on transabdominal ultrasonography, can be specifically diagnosed using the endovaginal method.

Despite the advantages of the procedure, most investigators continue to use it as an adjunct to transabdominal ultrasonography. In one prospective study comparing the two techniques, however, endovaginal ultrasonography provided more information in 65 of 108 nonpregnant patients and was judged inferior in only 4 instances. It was concluded that the endovaginal method could become the initial approach for routine pelvic sonography, with the use of the transabdominal approach advocated in selected patients.

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## Percutaneous Cholecystostomy for Acute Cholecystitis

CHOLECYSTECTOMY is the accepted method of treating patients with acute cholecystitis. Because emergency cholecystectomy for acute cholecystitis is associated with a higher mortality rate than an elective procedure, some suggest delaying cholecystectomy until a patient is less ill. Cholecystostomy has been advocated to decompress the inflamed gallbladder until the patient's condition allows a definitive cholecystectomy. Recent reports have shown that percutaneous cholecystostomy may be helpful in managing patients admitted to hospital with suspected acute cholecystitis.

Several catheter systems have been developed for percutaneous cholecystostomy. The catheters all have a securing device such as a Cope-type loop to prevent catheter dislodgement from the gallbladder. Although ultrasonography, computed tomography, and fluoroscopy have been used to guide catheter insertion, ultrasonography is the most frequently used method to guide percutaneous cholecystostomy. Its advantage is that the equipment is portable and therefore the entire procedure can be done at a patient's bedside.

The cholecystostomy catheter may be inserted by one person under ultrasonographic guidance. After the gallbladder is located with ultrasonography and using only local anesthesia, the catheter system is placed transhepatically under real-time control into the gallbladder. After the catheter is placed, a specimen of bile is taken for culture and the catheter is positioned for intermittent suction. A fluoroscopy-guided cholangiogram through the catheter is usually not done until 48 hours after catheter insertion.

Reports of percutaneous cholecystostomy have shown that major complications, such as catheter dislodgement or hemorrhage, are few, the incidence comparing favorably with that of complications from surgical cholecystostomy.

In a few instances of gangrenous cholecystitis, cholecys-

tostomy may not prove helpful and patients will require emergency cholecystectomy. In most circumstances, however, the patient's condition improves after catheter placement, and further treatment, such as a cholecystectomy, can be delayed. In fact, in a large number of patients in hospital, especially those with acute acalculous cholecystitis, percutaneous cholecystostomy has proved to be a definitive treatment, thus completely avoiding cholecystectomy.

Percutaneous cholecystostomy may be a safe and beneficial method to manage patients with suspected acute cholecystitis.

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## Gadolinium in Magnetic Resonance Imaging of the Central Nervous System

MAGNETIC RESONANCE IMAGING (MRI) has become an important initial method for the diagnostic imaging of diseases of the central nervous system. Magnetic resonance imaging, however, has difficulty in distinguishing the alteration of the blood-brain barrier of a localized pathologic lesion that may be surrounded by extensive edema. This difficulty has prompted the development of gadolinium-labeled diethylenetriaminepentaacetic acid (Gd-DTPA), known in the United States as gadopentetate dimeglumine (Magnevist). The availability of Gd-DTPA as an approved contrast agent for use in diagnosing central nervous system disorders has revolutionized the capabilities of MRI. It is now possible not only to identify a localized or diffuse disorder with great sensitivity but also to demonstrate the alteration of the blood-brain barrier following the intravenous administration of Gd-DTPA.

A wide variety of both intra-axial and extra-axial tumors are optimally visualized following the administration of Gd-DTPA. Metastatic brain tumors as small as 2 to 3 mm may be shown following Gd-DTPA enhancement. Gd-DTPA-enhanced MRI is now the imaging procedure of choice for patients with possible metastatic disease to the brain or spinal cord. Metastatic disease to the meninges may be difficult to show with conventional x-ray computed tomography because of the Hounsfield artifact problem. This limitation is resolved with MRI. In the presence of meningeal tumor deposits, there is notable enhancement of the dural margins following the administration of Gd-DTPA.

Images of infections of the meninges, either acute or chronic, and parenchymal infections such as an abscess or fungal granuloma usually are enhanced after a Gd-DTPA infusion. Aneurysms and arteriovenous malformations are well shown on conventional MRI scans. Enhancement is variable, depending on the rate of flow through these lesions. High flow regions within arteriovenous malformations or aneurysms will not be enhanced. The visualization of areas of slow flow in venous or cryptic malformations may be improved with contrast enhancement.

Gd-DTPA-enhanced MRI has become the state-of-the-art method of imaging a variety of abnormalities. It has